

What is claimed is:

1 1. A method for forming a single-crystal silicon
2 layer on a transparent substrate, comprising:

3 providing a transparent substrate having an
4 amorphous silicon layer formed thereon and a
5 silicon wafer having a hydrogen ion layer
6 formed therein;

7 inverting and laminating the silicon wafer onto the
8 amorphous silicon layer so that a layer of
9 single-crystal silicon layer is between the
10 hydrogen ion layer and the amorphous silicon
11 layer; and

12 subjecting the laminated silicon wafer and the
13 amorphous silicon layer to laser or infrared
14 light to cause chemical bonding of the single-
15 crystal silicon layer and the amorphous silicon
16 layer and inducing a hydro-cracking reaction
17 thereby separating the silicon wafer and the
18 transparent substrate at the hydrogen ion
19 layer, and leaving the single-crystal silicon
20 layer on the transparent substrate.

1 2. The method as claimed in claim 1, further
2 comprising subjecting the single-crystal silicon layer to
3 high temperature annealing and chemical mechanical
4 polishing thus reconstructing the silicon atoms to form a
5 smooth surface.

1 3. The method as claimed in claim 1, wherein the
2 transparent substrate is glass, quartz, synthetic quartz,
3 LiNbO₃ or LiTaO₃.

1 4. The method as claimed in claim 1, wherein the
2 laser energy is 50~400 mJ/cm².

1 5. The method as claimed in claim 1, wherein the
2 wavelength of the infrared light is 0.7~1.5 μ m.

1 6. The method as claimed in claim 1, wherein the
2 hydrogen ion layer is formed by doping with a dosage of
3 $1 \times 10^{16} \sim 5 \times 10^{17}$ cm⁻² and energy of 10~1000 keV.

1 7. The method as claimed in claim 1, wherein the
2 depth of the hydrogen ion layer is 0.1~15 μ m from the
3 surface of the silicon wafer.